



Contribution ID: 276

Type: **Poster**

M1Po3A-01: Measurements of composite Bi-2212 Rutherford cable's mechanical properties.

Monday 19 May 2025 14:00 (2 hours)

The U.S. Magnet Development Program (US-MDP) explores high-field accelerator magnets that require operating conditions beyond the limits of Nb₃Sn technology. The ongoing R&D process for High-Temperature Superconductor (HTS) characteristics enhancement suggests using Bi₂Sr₂CaCu₂O_{8-x} (Bi-2212) as a superconductor element. Coils made of Bi-2212 Rutherford cable maintain high critical current (I_c) when submerged in high external magnetic fields. The Nb₃Sn mechanical properties are well described and can be found in the literature. Concerning the Bi-2212 superconductor, the sources are limited. In this paper, a set of Bi-2212 Rutherford cables was obtained from a previously realized racetrack coil and used to perform a post-mortem mechanical properties analysis of the superconductor. The samples studied are described and characterized geometrically and mechanically. Results are discussed and collected in tables highlighting the measurements performed at room and cryogenic temperatures in liquid Nitrogen. The empirical data were then inserted into the APDL code to characterize the 3D Bi-2212 Rutherford cable model realized for modeling analysis.

Author: D'AGLIANO, Alessio (FNAL)

Co-authors: BARZI, Emanuela (Fermilab); VALLONE, Giorgio (Lawrence Berkeley National Lab. (US)); NOVITSKI, Igor (Fermilab); CROTEAU, Jean-Francois (Lawrence Berkeley National Laboratory); Prof. DONATI, Simone (Istituto Nazionale di Fisica Nucleare - Pisa); SHEN, Tengming (Lawrence Berkeley National Laboratory); GIUSTI, Valerio (University of Pisa / INFN Pisa)

Presenter: D'AGLIANO, Alessio (FNAL)

Session Classification: M1Po3A - Materials Aspects of HTS